TRANSNET

port terminals

TECHNICAL SPECIFICATION

SUBJECT	:	**SKID STEER LOADER**
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1. Scope

This specification is for a diesel engine driven, four wheel drive skid steer loader with hydraulically actuated lifting mechanism that will be used for the handling of residual bulk and break bulk commodities.

The skid steer loader (SSL) shall be supplied complete in all respects, including standard equipment supplied by the manufacturer and shall comply with the South African Occupational Health and Safety Act, Act 85 of 1993/as amended or equivalent international standard for mobile lifting equipment such as ISO, DIN, etc.

The SSL shall be designed to operate in a coastal corrosive environment, under heavy dust laden conditions, suitable for the handling of coarse and abrasive material, as well as sludge and slurries, and must be able to operate on any floor surface and negotiate speed bumps.

2. Operational Requirements

2.1 Site Specific Requirements

Refer to the Goods Information for the following specific requirements:

2.1.1 The materials to be handled and their densities.

2.1.2 The bucket capacity (m^3 as per SAE heaped) of product that the SSL is required to handle with each scoop of the bucket.

2.1.3 The payload (kg) that the SSL must be able to handle with each scoop of the bucket.

2.1.4 The dump clearance at maximum lift, and maximum dump angle.

2.1.5 The reach at dump height (horizontal distance from front of tyre to bucket leading edge at maximum lift and maximum dump angle.

2.1.6 The SSL bucket width. Note that the width of the SSL shall at no point exceed the width of the bucket.

2.1.7 The travelling speed that the SSL must be able to obtain, and whether machine has a single speed or two speed transmission.

2.1.8 Any additional attachments terminal requires for the SSL.

2.1.9 Any additional operator control function requirements in the cabin.

2.1.10 Requirements for rear view cameras, and the size of the monitor to be mounted in the cabin.

2.1.11 Requirements for a load speaker system to enable the operator to communicate with people in the surrounding area.

2.1.12 Requirement for a spare set (4 off) of solid tyres complete with rims.

2.2 Ergonomics

Operator's Cab

2.2.1 A fully enclosed, centre mounted cab which is ergonomically designed, well insulated and weather proof, providing maximum drivers visibility and comfort is required.

2.2.2 The cab shall be of robust construction, shall be ROPS/FOPS certified, and designed for all round (360 deg) vision, as well as vertical visibility, i.e. a roof window.

2.2.3 The cab shall be designed in a manner to prevent the ingress of dust generated due to product handling, and shall be pressurised.

2.2.4 A comfortable, full suspension, fully adjustable, sprung type seat, in accordance with EN 13059, complete with arm rests and seat belt, and upholstered with a good quality durable liquid resistant cleanable leather type material, shall be fitted.

2.2.5 The noise inside the cab shall not exceed 65 dBA.

2.2.6 All glass shall be anti – glare scratch proof tinted heat-treated toughened safety or toughened laminated glass.

2.2.7 Electric windscreen wipers and windscreen washers shall be provided on the front windows.

2.2.8 Windows shall be lockable in both the open and closed positions.

2.2.9 The cab door shall be the hinged type, lockable in the closed position, and equipped with a stay to hold it in the open position.

2.2.10 Driver's seat shall be fitted with a safety bar. If driver is not seated and safety bar in the 'lock' position, SSL shall not be able to start.

2.2.11 An interior light shall be fitted.

2.2.12 The operators cab shall be air-conditioned as per the requirements of section 3.10.

2.2.13 Bolt on foldable wide view mirrors, to allow access into confined spaces, shall be fitted on both sides of the cab.

2.2.14 A demister/heater, in addition to an air conditioner, with a minimum two speed blower shall be supplied.

2.2.15 The ventilation system shall be appropriately filtered to prevent the ingress of dust generated due to product handling.

3. Technical Requirements

3.1 Chassis

3.1 A steel chassis is required.

3.2 Engine

3.2.1 Engines shall be robust, four stroke liquid cooled and have sufficient power for the duty required.

3.2.2 The air cleaning system (cyclone or similar) shall be designed to prevent the ingress of dust into the engine.

3.2.3 The exhaust outlet must be of the 'goose neck' type to prevent the ingress of water under any operational or non-operational conditions.

3.2.4 The exhaust pipe shall be from stainless steel.

3.2.5 The exhaust pipe must be protected by a stainless steel heat shield if it is exposed and could cause injury to the driver or any other person.

3.2.6 The outlet manifold must be protected by a heat shield if exposed when the engine compartment is opened.

3.2.7 An engine monitor and cut-out system shall be fitted to protect the engine from over heating, low oil pressure, over revving and other abnormal operating conditions.

3.2.8 The engine management system shall allow for shutting the engine down, whilst ensuring that the terminal operational equipment remains operational, when the seat is not occupied for a predetermined time lapse. (Supplier to indicate the time period. However, facility must be available to allow Purchaser to adjust the time period.)

3.2.9 The engine shall comply with "EUROMOT III" with regard to emission standards.

3.3 Transmission

3.3.1 A single speed (low range) fully automatic hydrostatic transmission is required, unless otherwise stated in the Goods Information.

3.3.2 The transmission shall be fitted with a tamperproof mechanical or electronic forward/reverse protection device to protect the machine should the driver engage reverse whilst the machine is still moving forward and vice versa.

3.4 Road Wheels

3.4.1 Tyres manufactured in the Republic of South Africa or tyres which are readily available in South Africa shall be fitted.

3.4.2 Tyres and rims must conform to the standards as laid down in S.A.N.S. ARP 007 and ARP 008 and shall be of an approved brand.

3.4.3 The tenderer shall supply the machine with heavy duty pneumatic tyres.

3.4.4 Where possible, the front and rear tyres must be the same size and ply rating, and the rims interchangeable between front and rear.

3.4.5 A tyre pressure monitoring system shall be provided.

3.4.6 A spare set of solid tyres and rims shall be provided if requested in the Goods Information.

3.5 Brakes

3.5.1 The SSL shall be fitted with an efficient braking system capable of stopping and holding when fully loaded on a gradient of 1:3.

3.6 Hydraulic System

3.6.1 An efficient filter must be incorporated in the suction line to the hydraulic pump.

3.6.2 The oil reservoir shall be fitted with a sight glass suitable for visual inspection of the fluid level.

3.6.3 The hydraulic system shall comprise of suitable preventative and protection features to prevent over heating and pressure loss.

3.6.4 Test points for testing hydraulic pressures must be fitted. These points must be grouped together. Where possible, steel tubing, which shall be treated with suitable corrosion protection, in lieu of rubber hosing, must be used for hydraulic lines.

3.6.5 All hydraulic fittings shall be wrapped with a petrolatum impregnated tape or sprayed with a petrolatum primer to prevent corrosion.

3.6.6 All hydraulic cylinder rams shall be fitted with suitable bellows to protect the sealing surfaces.

3.7 Fuel Tank

3.7.1 The tank capacity shall allow for enough fuel for an eight hour shift.

3.7.2 The fuel line between the tank and the fuel pump shall be fitted with an in-line strainer.

3.7.3 A water trap and in-line fuel filter shall be fitted after the pump.

3.7.4 The fuel cap(s) shall be lockable with an attachment to the body of the SSL.

3.7.5 The tank must be fitted with a lockable manual drain valve.

3.7.6 The tank must be manufactured from 316L stainless steel.

3.8 Electrical

3.8.1 A 24 volt negative earth system is required.

3.8.2 An alternator (current regulator) shall be supplied.

3.8.3 Two heavy duty maintenance free 12V battery(s) shall be supplied and fitted in a suitable lockable corrosion proof battery carrier or tray. Details of battery carrier to be supplied.

3.8.4 A battery isolating switch, with an attachment to the body of the SSL, shall be fitted.

3.8.5 All electric wiring shall be colour coded, grommited, numbered, sleeved, trunked and securely clamped. Wire numbers to be carried through into the schematic diagrams and detailed drawings.

3.8.6 An easily accessible fuse panel shall be supplied.

3.8.7 An electrical power take off point for boost charging the batteries shall be supplied and fitted with a two pin female receptor rated for 600V 175A . ("ANDERSON" or equivalent)

3.8.8 Electronic components must be protected from the surge in power whilst jump starting. Details of protection system used shall be furnished.

3.8.9 The machine shall be fitted with the following minimum lighting system:

- 2 x headlamps
- 2 x LED tail lights
- 2 x LED stop lights
- 2 x LED front and 2 x LED rear direction indicator lights
- 2 x LED reverse lights coupled to an automatic reverse warning sound mechanism
- An amber strobe light shall be fitted in such a manner as to not hinder the operator
- Automatic reverse warning alarm

3.8.10 In addition to the above the machine shall be fitted with working lights located in at least the following positions:

- Two forward facing LED lights, mounted at the top front of the cabin
- Two rearward facing lights, mounted at the top rear of the cabin, to switch on only when reverse is engaged.

3.8.11 A spare 12 Volt connection shall be made available in the operator's cabin for the connection of a two-way radio.

3.9 Instrumentation

3.9.1 The following instruments or gauges, amongst others, shall be fitted and these must be clearly visible to the operator at all times:

- Speedometer with odometer
- Rev counter
- Temperature indication for engine coolant and over heating
- Fuel level indication
- Engine oil pressure indication and warning light
- Engine hour meter
- A back lit instrument panel is required

3.9.2 All additional instruments and gauges that will be fitted shall be listed separately.

3.10 Air-conditioner

3.10.1 Ambient temperatures encountered may range from 0° C to +45° C dry bulb, with relative humidities varying from 15% to 100%.

3.10.2 All the components must be dust proof and watertight.

3.10.3 The air must be distributed environmentally and not directly onto the driver, and must regulate the temperature between 18° C and 24° C (dry bulb).

3.10.4 Braided flexible tubing must be used to make connections to the compressor.

3.10.5 Air-conditioner shall be locally supported with spares available locally.

3.10.6 When operator's cabin door/s is left open the air-conditioner shall switch off after a predetermined time lapse. (Supplier to indicate the time period.)

3.10.7 The air-conditioner shall be fitted with a heavy duty air filter.

3.11 Painting

3.11.1 The SSL shall be painted in accordance with Specification EEAM-Q-008 for Corrosion Protection. (The manufacturer's standard painting procedure can be used if it is equivalent or better than that called for above. Full details of these specifications and procedures shall be clearly stated if tenderer proposes to use another system, and is to be approved by the TPT Supply Manager prior to fabrication.)

3.11.2 The colour scheme of the vehicle shall be as follows:
- Cab and body painted red to colour specification RAL 3020.
- Wheel rims painted red to colour specification RAL 3020.
- Bucket and bucket arms painted red to colour specification RAL 3020.

No other colours will be accepted.

3.11.3 All joints on the chassis shall be thoroughly sealed with an approved sealer to prevent rusting between mating surfaces.

3.11.4 Drain holes shall be provided in areas where water can accumulate.

3.11.5 All paintwork shall carry a minimum ten year warrantee against corrosion.

3.12 Signage and Markings

3.12.1 A machine data plate shall be fitted in the cab.

3.12.2 Warning stickers shall be provided at all locations on the SSL that impose a danger.

3.12.3 Information stickers in specific locations to assist the driver/maintenance staff with the operation/maintenance of the SSL shall be supplied.

3.12.4 A fuse diagram shall be displayed at the fuse box.

3.12.5 Retro-reflective tape shall be fitted to both sides and the rear of the SSL.

3.12.6 The Transnet Logo (white on the red background) is to be provided on each side of the machine. (Position and size to be agreed.)

4 Safety and Environment

4.1 Safety Requirements

4.1.1 The SSL shall comply with the South African Occupational Health and Safety Act, Act 85 of 1993/as amended.

4.1.2 Access steps and safety handrails shall be provided.

4.1.3 All surfaces where operating or maintenance personnel shall tread must be laid out with non-slip material.

4.1.4 Suitable fire extinguishers shall be provided.

4.1.5 An audible hooter shall be fitted with a minimum sound level of 93dB as per SANS 10169:2004.

4.1.6 The SSL shall be fitted with suitable headlamps, tail / stop lights, reverse lamp and buzzer, direction indicator lights (front and rear), and an amber strobe light. In addition the machine shall be fitted with working lights. (Refer 3.8.9 & 10.)

4.1.7 The SSL shall be fitted with Falling Object and Roll Over Protection Systems.

4.1.8 An automatic reverse warning sound mechanism shall be fitted, and shall be in the range of 80 - 85 dB.

4.2 Environmental Requirements

4.2.1 The bucket and hydraulic systems to be designed in a manner to prevent contamination of product due to hydraulic spills, leaks, etc.

4.2.2 The SSL shall be recyclable.

5 Maintenance

5.1 Lubrication

5.1.1 A list of all recommended lubricants and the associated application shall be furnished by the supplier before the machine is delivered.

5.1.2 The machine must be fitted with a centralised manual greasing system.

5.1.3 The grouped grease points must be clearly marked by means of a yellow circle of approximately 2,5 cm in diameter.

5.2 Accessibility

5.2.1 All replaceable items including (but not limited to) critical components shall be designed for easy access, removal and replacement.

6 General

6.1 All components fitted and supplied shall be new.

6.2 The machine shall be to I.S.O. Metric Standards, and instrumentation gauges, dials, etc. shall be graduated in Systeme International (S.I.) units.

6.3 The machine must be supplied with detailed maintenance, operating, training and spares manuals (in English), including technical data for each spare, as well as general arrangement drawings and a bill of materials. Maintenance manuals to have sufficient information to allow terminal to capture

maintenance schedules in terms of inspections, servicing and replacement of parts. Three hardcopies and two electronic copies of the operating, maintenance, training and spare parts manuals shall be provided, as well as a training manual for each trainee.

6.4 The vehicle will only travel within the boundary of the port; however it shall comply with the requirements of The South African Road Traffic Act where applicable.

7. Referenced Specifications

7.1 Standard specifications

The following, not necessarily comprehensive, list of standard specifications are relevant:

ANSI/AWS D1.1	Structural Welding Code - Steel
BS-EN 287 Part 1	Approval testing of welders/fusion welding
BS EN ISO 15614-1:2004+A2:2012	Specification and qualification of welding procedures for metallic materials.
BS EN 1011-2:2001	Welding. Recommendations for welding of metallic materials Arc welding of ferritic steels
BS EN ISO 17640:2010	Non-destructive testing of welds. Ultrasonic testing. Techniques, testing levels, and assessment
BS EN ISO 17636-2:2013	Non-destructive testing of welds. Radiographic testing X- and gamma-ray techniques with digital detectors
BS 5493	Code of practice for protective coating of iron and steel structures against corrosion
DIN 1026	Metric channels
ISO R657	Angles
BS EN ISO 898-1:2013	Mechanical properties of fasteners made of carbon steel and alloy steel Bolts, screws and studs with specified property classes. Coarse thread and fine pitch thread
BS 3692:2001	ISO metric precision hexagon bolts, screws and nuts.
SANS 121/ISO1461	Hot-dip (galvanized) zinc coatings
SANS 1091	National colour standards for paint
SANS 1431	Weldable structural steels

Regardless of which specifications are actually worked to when manufacturing Plant and Materials, such Plant and Materials shall be capable of satisfactorily passing all tests laid down in the standard specifications called for.

7.2 Employer specifications

The following Employer specifications are relevant:

EEAM-Q-006	Structural steelwork
EEAM-Q-008	Corrosion protection
EEAM-Q-009	Quality Management

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